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**Solving the Air-Ground Dilemma:
An Examination of Air Power's Relationship
To Ground Operations**

**A MONOGRAPH
BY
Major John D. Hall
United States Army**



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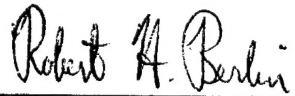
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ABSTRACT

SOLVING THE AIR-GROUND DILEMMA: AN EXAMINATION OF AIR POWER'S
REALTIONSHIP TO GROUND OPERATIONS by MAJ John D. Hall, U.S. Army, 50 pages.

This monograph examines the nature of air-ground operations within the context of interdiction and close air support, and their relationship to the Fire Support Coordination Line. The primary research question for this study was whether changes to the current doctrine regarding deep operations and interdiction are required, given the stakes the Army and the Air Force have in the deep battle area. It analyzes the air-ground dilemma by first examining how the relationship between Close Air Support, Battlefield Air Interdiction, and Air Interdiction changed between 1980 and 2000. It then examines the nature of the controversy surrounding Battlefield Air Interdiction and why it was never formally incorporated into Air Force Doctrine. The study also explores the impact the AH-64 Apache Helicopter and the Army Tactical Missile System had on the conduct of air-ground operations, as well as how the placement of the Fire Support Coordination Line effected the relationship between air and ground combat power. Finally, the monograph examines different solutions to the air-ground problem to determine which has the greatest potential.

Research confirms that the traditional relationship between Close Air Support and Air Interdiction began to change when the Army developed its AirLand Battle Doctrine. Battlefield Air Interdiction evolved directly out of AirLand Battle doctrine, but the lingering controversy surrounding BAI prevented it from integration into official Air Force doctrine, in spite of its adoption by the Joint staff, the NATO staff, and the Army. Given only partial support for BAI within the Air Force, many targets attacked from the air did not have a relationship to ground operations. Thus, air operations in the Persian Gulf were closer to traditional Air Interdiction than the Battlefield Air Interdiction variety land commanders expected. At the same time, the war validated the use of the AH-64 Apache and the Army Tactical Missile System to conduct deep operations autonomously, and as a result the Army's dependence on air power dropped considerably. After the war, BAI was formally eliminated from Army and Joint doctrine, and the meaning, use, and placement of the Fire Support Coordination Line became a serious point of contention between the services. The relationship between Close Air Support, Air Interdiction, and the Fire Support Coordination Line eventually became so intermingled that it became impossible to resolve one issue without further complicating another.

This study concludes that changes to the current doctrine regarding deep operations and interdiction are most definitely required if the Army and the Air Force hope to resolve the problems associated attacking targets in the deep operations/Air Interdiction area. The best solution to the problem is a radical departure from current thought on the issue. It is encompassed under a concept called Air-Ground Interdiction (AGI), where attacks by either air or land component assets are integrated with their component counterparts in such a way that a symbiotic relationship between air and ground forces develops, and the synergism generated by combining air operations with land component maneuver and fires maximizes the effects against the enemy.

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INTRODUCTION

Background

The Army's introduction of the Apache helicopter and the Army Tactical Missile System (ATACMS) in the early 1990s gave ground commanders the ability to operate freely in areas traditionally dominated by the Air Component's fixed wing aircraft. Instead of operating relatively close to front line forces, the Army began conducting tactical operations well beyond indirect fire ranges, which in turn blurred the traditional distinction between the fixed wing roles of Close Air Support and Air Interdiction. Determining the proper "division of labor" in the area 30-70 kilometers from the forward line of troops (FLOT) developed into a frequently bitter debate between the U.S. Army and Air Force on how to best integrate air and ground operations. Almost ten years after the fielding of these weapons systems, neither service is satisfied with the current doctrine regarding this issue.

Some in the Air Force are concerned that the Army is increasingly claiming huge volumes of "battle space," which decreases the ability of joint forces to operate in front of ground forces.¹ They believe that the Army lacks the weapons and command, control, and communications (C³) systems needed to operate at extended depths. Thus, the Air Force wants the Joint Force Land Component Commander (JFLCC) to have a forward boundary as close in as possible in order to allow for the unconstrained employment of air. Donald Oxford argues that this position reflects the service's concern that relegation of some or all air power employed in the JFLCC area of operations to a supporting role detracts from its maximum efficiency.² The Air Force also believes the Fire Support Coordination Line (FSCL) constrains the use of air power and therefore, they want it placed approximately at the range of the Army's cannon and

rocket artillery (30-45 Km). They believe that deeper placement of the FSCL constrains the use of the Joint Force Air Component Commander's (JFACC) combat power, and may provide a sanctuary for the enemy between the range of artillery and the FSCL.³

The Army, on the other hand, believes that the advent of Apaches and ATACMS provide it with the capability to operate freely out to extended depths, and that this ability necessitates the implementation of positive control measures out beyond the range of conventional artillery. The Army sees the FSCL as a "permissive" coordination measure, facilitating fires beyond the line, while the Air Force sees the FSCL as a "restrictive" measure, which requires coordination and meticulous control of air power short of the line. This often impedes the application of air power in Air Force's view.

The Air Force has also argued that that all operations beyond the range of observed fires should be under the purview of the JFACC unless friendly forces are maneuvering in the area. Articulated in a document called the "JFACC Primer Second Edition," the paper claimed that the JFACC and Special Operations Component Commanders were those with the most forces at risk beyond the range of conventional artillery.⁴ As a result, the responsibility for synchronizing theater interdiction assets should be vested in the commander who has the preponderance of attack assets and the command, control, communications and intelligence (C³I) capability to conduct these operations; normally the JFACC.

Efforts to resolve the dilemma surrounding Close Air Support, Air Interdiction, and the Fire Support Coordination Line have only been partially successful. Some of the more mature theaters, particularly Korea, through extended dialogue and extensive coordination, have worked out deep operations/interdiction procedures acceptable to both the land component and air component commanders. However, in the majority of joint operations, the lack of a common understanding and doctrinal framework for air-ground operations results in considerable challenges for the joint force commander and his subordinates. The shortfall in joint doctrine

compels Joint Task Force, Air Component, and Land Component commanders to work out a series of compromises upon the formation of each new task force.

Purpose

This monograph examines the nature of air-ground operations within the context of interdiction and close air support, and their relationship to the Fire Support Coordination Line. The primary research question for this study was whether changes to the current doctrine regarding deep operations and interdiction are required, given the stakes the Army and the Air Force have in the deep battle area. Five subordinate research questions provided the answer to the primary question, namely:

- 1) How has the relationship between Close Air Support, Battlefield Air Interdiction, and Air Interdiction changed over the last twenty years?
- 2) Why did Battlefield Air Interdiction disappear from the doctrine?
- 3) What impact did the introduction of the Apache helicopter (AH-64) and the Army Tactical Missile System (ATACMS) have on the conduct of Air-Ground operations?
- 4) How has placement of the Fire Support Coordination Line effected past air-ground operations?
- 5) What changes to existing doctrine would best solve the problem?

Method and Criteria

This study answered these questions by first examining air-ground operations under the Army's AirLand Battle doctrine of the 1980s, when Army and Air Force cooperation and understanding were at their zenith. It then assessed the impact of the Persian Gulf War on air-ground operations, in order to determine where, when, and how differing perspectives on the use of air power began to erode the Army-Air Force relationship. Based on this analysis, the study examined three possible solutions to the air-ground dilemma in an attempt to determine the best

possible solution to this very complex problem. The evaluation criteria used as the basis for comparison between the courses of action were: 1) their potential to satisfy the Joint, Army, and Air Force communities simultaneously, 2) the degree of doctrinal change required to implement the course of action, and 3) the degree of improvement in efficiency that would result if the option was applied.

Conclusions of the Study

This study concluded that the traditional relationship between Close Air Support and Air Interdiction began to change when the Army developed its AirLand Battle Doctrine. Because it lacked the assets to conduct deep operations on its own, the Army lobbied for the introduction of Battlefield Air Interdiction, where deep attacks shaped future battles on the ground. BAI gained some support within the Air Force, but it remained a controversial issue among airmen for years. Some in the Air Force saw it as a modified form of CAS due to its relationship to ground forces, while others saw it as a form of interdiction because it attacked targets not in contact with friendly forces. The lingering controversy regarding BAI prevented its integration into official Air Force doctrine, in spite of adoption by the Joint staff, the NATO staff, and the Army.

When the Persian Gulf War began, airmen hoped to win the conflict before the commitment of ground combat power became necessary. Initial air operations, therefore, concentrated on attacking the Iraqi infrastructure, rather than the ground combat forces normally associated with BAI targets. Even after it became obvious that the commitment of coalition ground forces was necessary, air operations focused on attacking targets that had little relationship to the scheme of maneuver, and the Air Component did not attack the high payoff targets that the VII and XVIII Corps Commanders wanted attacked. Because the targets attacked did not relate to ground operations, air operations in the Persian Gulf were closer to traditional Air Interdiction than the Battlefield Air Interdiction variety land commanders expected.

At the same time, the war validated the use of the AH-64 Apache and the Army Tactical Missile System for conducting deep operations autonomously, and as a result the Army's dependence on air power to dropped considerably. These new weapons systems operated in areas formally dominated by the Air Force, further complicating the relationship between Close Air Support and Air Interdiction. After the war, BAI was formally eliminated from Army and Joint doctrine, and the meaning, use, and placement of the Fire Support Coordination Line became a serious point of contention between the services.

Close Air Support, Air Interdiction, and the Fire Support Coordination Line became so intertwined with one another that it became impossible to clarify one issue without further complicating another. Airmen saw the FSCL as restrictive, the Army and the Joint Staff saw it as permissive. Some argued that it should form the dividing line between ground and air power's battlespace, while others argued that the line should have no bearing on CAS or AI whatsoever. This resulted in a series of lengthy modifications to doctrinal definitions that did more to reflect the parochial positions of the two services than actually solve the underlying problem.

The most important conclusion of this study, however, was that changes to the current doctrine regarding deep operations and interdiction are most definitely required if the Army and the Air Force are to resolve the problems associated with the attack of targets in the deep operations/Air Interdiction area. The best solution to the problem is in fact a radical departure from current thought on the issue. It is encompassed under a concept called Air-Ground Interdiction (AGI), where attacks by either air or land component assets are integrated with their component counterparts in such a way that a symbiotic relationship between air and ground forces develops, and the synergism generated by combining air operations with land component maneuver and fires maximizes the effects against the enemy.

CHAPTER 1

AIR-GROUND OPERATIONS UNDER AIRLAND BATTLE DOCTRINE

Between 1976 and 1986, the Army experienced a renaissance regarding its understanding and application of operational art, primarily the result of experiences gained from the war in Vietnam combined with an analysis of Warsaw Pact forces threatening the security of Europe. The two key revelations emerging from this new found cognition were 1) a recognition of the operational level of war, where the joint force commander's strategy is translated into a series of tactical actions designed to accomplish those objectives, and 2) the realization that defeat of an enemy is most efficiently accomplished through the use of a number of synchronized, simultaneous attacks throughout the depths of his formations.⁵ When the importance of attacking the enemy in depth became evident, doctrine developers realized that a gap existed between the traditional Air Force missions of Close Air Support (CAS) and Air Interdiction (AI). First under the auspices of NATO, then eventually in Army doctrine, a concept called Battlefield Air Interdiction (BAI) emerged to fill the void associated with the deep attack of targets in support of ground operations. Having no deep attack assets of its own at the time, the Army also recognized very early in the development of its revised doctrine that it was totally dependent on the Air Force to provide depth at both operational and tactical levels of war. Unfortunately, the Air Force was less enthusiastic about its role in supporting Army deep operations.

The AirLand Battle Concept

AirLand Battle emerged from the ashes of the Active Defense, under which winning the "first battle" against Warsaw Pact forces was seen to be the key element of victory should war erupt in Western Europe. Following its introduction in the 1976 edition of *Field Manual 100-5*,

Operations (FM 100-5), Active Defense was the subject of substantial criticism, largely because it relied on defensive operations using technologically superior firepower and the lateral repositioning of defending forces to attrit enemy forces.⁶ General Donn Starry, Commanding General of the Army's V Corps during this period, became increasingly convinced that an extension of the battlefield was necessary for winning a modern battle in Europe. Starry's doctrinal thoughts evolved from "Central Battle" to the "Extended Battle" to what eventually became the "AirLand" battle. Starry carefully chose this term in order to convey the doctrinal shifts he was proposing while simultaneously sending a signal to the Air Force that the Army envisioned a strong partnership between the two services in any future battle.⁷

The 1982 edition of *FM 100-5* attempted to articulate General Starry's concept of AirLand battle in terms familiar to its targeted audience. It included a discussion on the principles of war, addressed the four elements of combat power, and discussed the various imperatives of combat operations. A more offensively oriented tone replaced the defensive character of the 1976 version, but most importantly, the 1982 manual introduced the operational level of war to the Army, and it established and articulated the four tenants of AirLand Battle: agility, depth, synchronization, and initiative.⁸ Moreover, Air Interdiction was a critical element of the extended battlefield notion incorporated within AirLand Battle doctrine.⁹ Unfortunately, the 1982 *FM 100-5* did not fully describe the operational level of war as the linchpin between strategy and tactics, nor did it clearly differentiate between tactical and operational warfighting.¹⁰ Starry's successor at the Army's Training and Doctrine Command (TRADOC), General William Richardson, recognized the shortcomings of the 1982 edition and promptly directed a revision of the manual. The results of General Richardson's revision efforts, published in the 1986 edition of *FM 100-5*, represented what Shimon Naveh called "a quantum leap in operational cognition".¹¹

In terms of air-ground operations, the 1986 edition of *FM 100-5* articulated the need for ground forces to receive air protection and the requirement that air interdiction be synchronized

with ground operations. At the same time, the updated doctrine implicitly accepted the Air Force's proposition that decisions regarding the synchronization of air and ground operations would be made in the context of *campaign* objectives, not merely the tactical dictates of individual *battles*. This realization brought AirLand Battle into closer harmony with Air Force perspectives on the employment of air power.¹²

Close Air Support, Air Interdiction, and Battlefield Air Interdiction

Under AirLand Battle doctrine, fixed wing operations in support of ground commanders fell into a category called Offensive Air Support (OAS). Originally developed as part of NATO doctrine, OAS consisted of Close Air Support (CAS), BAI, and Tactical Air Reconnaissance. OAS was an integral element of both offensive and defensive operations.¹³ The 1982 edition of *FM 100-5* defined CAS as:

Air action against hostile targets near friendly forces. CAS complements and reinforces ground fire. Each air mission must be integrated with the ground commander's fire and maneuver scheme. This means that aircraft are under either positive or procedural control. Inherent in the ground commander's responsibility is the need to suppress enemy air defenses. CAS can offset shortages of surface firepower during critical initial phases of airborne, airmobile, and amphibious operations.¹⁴

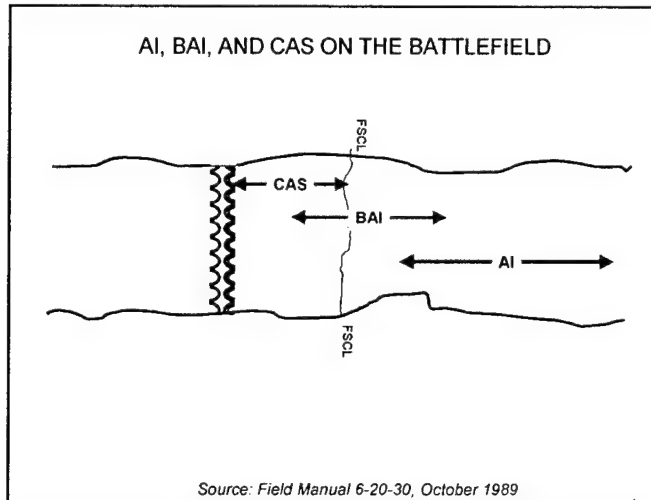
Likewise, the manual defined BAI as:

Air action against hostile surface targets nominated by the ground commander and in direct support of ground operations. *It is the primary means of fighting the deep battle at extended ranges* (emphasis added). BAI isolates enemy forces by preventing their reinforcement and resupply and by restricting their freedom of maneuver. It also destroys, delays, or disrupts follow on enemy units before they can enter the close battle. BAI missions may be planned against targets on either side of the FSCL in the ground commander's area of influence. Missions short of the FSCL require close coordination with ground units. Although all BAI missions require joint planning and coordination, they may not require continuous coordination in the execution stage.¹⁵

There was no mention of the traditional form of Air Interdiction in the 1982 *FM 100-5*, but the 1986 edition rectified this mistake by including a considerable discussion of AI and its purpose.

Air interdiction (AI) operations delay, disrupt, divert, or destroy an enemy's military potential before it can be brought to bear effectively against friendly forces. These

combat operations are performed at such distances from friendly surface forces that detailed integration of specific actions with the fire and movement of friendly forces is normally not required. Air interdiction attacks are normally executed by an air commander as part of a systematic and persistent effort.¹⁶



The figure on the left shows how CAS, BAI, and AI looked under AirLand Battle Doctrine. Note that while CAS targets fell short of the Fire Support Coordination Line (FSCL), and AI targets were beyond it, BAI targets could fall on either side of the line. This gray area regarding the location of BAI targets, and who controlled their attack, proved to be

the focal point of Air Force criticism regarding AirLand Battle doctrine.

Air Force Reaction to AirLand Battle Doctrine

In the aftermath of the war in Vietnam, the Army and the Air Force worked hard to establish a partnership that would facilitate the execution of a war in Western Europe. Besides the establishment of the Joint Directorate for Air-Land Forces Application (ALFA), TRADOC and the Air Force's Tactical Air Command (TAC) established a number of cooperative projects, many of which resulted in memorandums of agreement between the two agencies. Likewise, the close personal relations established between senior Army and Air Force leaders were vital to the strength of the partnership, and helped forge a peacetime bond that each hoped would withstand the rigors of war.¹⁷

Throughout the mid 1970s and early 1980s, the TAC-TRADOC team attempted to solidify air-ground operations under the AirLand Battle framework. In April 1983, TAC and TRADOC produced a joint memorandum regarding the enhancement of joint employment of

AirLand Battle doctrine. Endorsed by both the Army and Air Force Chiefs of Staff, the memorandum directed both services to use the 1982 edition of *FM 100-5* as the basis for increasing the integration of Army and Air Force tactical forces. The goals were to enhance inter-service planning and programming, continue the dialogue on doctrinal matters, work together on deep-attack systems, coordinate airlift requirements, and resolve issues concerning the integration of AirLand Battle into theater operations. The following autumn, the two service chiefs signed a memorandum of understanding between the Army and the Air Force that emphasized the planning and programmatic aspects of the previous memo and pledged the services to "initiate herewith a joint process to develop in a deliberate manner the most combat effective, affordable joint forces necessary for AirLand combat operations." This agreement committed the services to exploring 31 specific initiatives regarding air-ground operations that dealt with issues of air defense, rear area operations, suppression of enemy air defenses, special operations forces, munitions development, combat techniques and procedures, and the fusion of combat information.¹⁸ However, even on issues that had service chief endorsement, TAC-TRADOC dialogue was always influenced by the fact that TAC did *not* speak for the Air Force: the Air Staff continued to guard its prerogatives in doctrinal matters, and would often take a position different, sometimes even contrary, to that of TAC.

None of the 31 initiatives would be more controversial than Initiative #21, Battlefield Air Interdiction. The divergence over BAI centered several issues: 1) the influence of NATO tactical air doctrine on US Air Force doctrine; 2) differing opinions between the Army and the Air Force regarding the control of BAI planning and execution; 3) the Army's introduction of long range artillery and attack helicopters; and 4) the definition and placement of the Fire Support Coordination Line.¹⁹

The doctrinal basis for BAI went back to the 1979 edition of NATO's *Allied Tactical Publication 27(B), Offensive Air Support*, but the Air Force felt that BAI missions should be

controlled and directed by the air component commander, rather than apportioned to ground commanders. Thus, while the Air Force accepted ATP 27(B) as NATO doctrine, its position was that it was not part of official Air Force doctrine. Eventually a compromise between the Army and the Air Force was reached, and under a joint memorandum of agreement between TAC and TRADOC, the Air Force would control the execution of BAI missions, but corps commanders had a role in the planning effort, primarily regarding the prioritization of BAI targets.²⁰ Unfortunately, the lack of centralized doctrine development within the Air Force led to different interpretations of the agreements, adding additional confusion to an already complex issue. One frequently cited reference quotes an anonymous Air Force officer as saying "when we say we agree with the air-land battle concept, what we are saying is that we agree the concept is good for the Army."²¹

The Air Force command philosophy, expressed in the 1984 edition of *Air Force Manual 1-1, Basic Aerospace Doctrine of the United States Air Force (AFM 1-1)* was one of "centralized control-decentralized execution."²² Although the doctrine did not spell out the *level* of centralization, the Air Force preference was for control at the theater level of operations. From the Air Force perspective, the theater air commander should retain responsibility for control and direction of the entire air interdiction effort, while ground commanders supported by various air formations would have a voice only in the sub-allocation of CAS sorties to their subordinate units.²³

During this same period, the Army began developing extended-range systems that would allow corps commanders to fight deep battles. Systems such as the Apache helicopter, the Multiple Launch Rocket System (MLRS) and the Army Tactical Missile System (ATACMS) led to questions about how the effects of these systems would be coordinated with air operations.²⁴ The fielding of these systems gave the Army the capability to attack targets more than 100

kilometers from its front line forces using its own assets. Ground commanders no longer had to rely on fixed wing platforms to practice operational art at their level. As such, these newly developed capabilities placed the Army and the Air Force at odds.

The issue initially manifested itself in the placement of the Fire Support Coordination Line (FSCL). The FSCL, originally known as the "no-bomb line," evolved during World War II as a coordination measure to reduce, if not eliminate, the chance that aircraft might drop ordnance on friendly troops. Defined as a line *short of which* the release of air weapons required the prior clearance of a ground commander, it was traditionally placed at the range limit of friendly artillery.²⁵ As long as this range was in the neighborhood of 10-15 kilometers beyond the friendly front lines, the FSCL did not present much of a problem, since common sense alone dictated that air strikes within that range had to be coordinated with ground forces. Once the FSCL extended to the depths of new Army weapons, it significantly interfered with Air Force interdiction efforts and had the potential to allow enemy forces to escape attack by friendly air formations. If, on the other hand, the FSCL remained relatively close to the friendly front lines, corps commanders argued they would lose freedom of action in the employment of their fire support assets, since they were expected to coordinate fires beyond the FSCL with the Air Force prior to execution.²⁶ Attempts to resolve this dilemma were ultimately unsuccessful, and resulted in heated arguments between air and ground force commanders during the Persian Gulf War, with both sides claiming that opportunities were lost.

Summary

From 1973 to 1990, the Army and the Air Force formed a solid partnership centered on the Army's ability to execute its AirLand Battle doctrine with Air Force support. The strength of this partnership was evident in extensive bi-service training, doctrinal publications, and programmatic cooperation. Although the Air Force struggled internally with the notion of

AirLand Battle, and in particular the concept of Battlefield Air Interdiction, the Army's efforts to make the Air Force an equal partner in the execution of AirLand battle doctrine paid off, and at least unofficially, the Air Force bought into the concept.

Battlefield Air Interdiction emerged in the Joint and Army doctrine as the primary method of attacking enemy forces throughout the depths of his formations. It allowed ground commanders to have a strong voice in what targets would be attacked, where and in what priority, without overly hampering the traditional air interdiction effort far beyond the scope of current ground operations. In short, BAI served as a medium between the Close Air Support, which was highly controlled by ground commanders, and air interdiction, which was highly controlled by air commanders. However, in spite of support from TAC, the controversy surrounding BAI prevented its full integration into Air Force doctrine

The strain on the Army-Air Force partnership began when the Army developed and fielded systems that would allow it to execute deep operations semi-autonomously. Ground commanders felt that they needed an FSCL that extended to the limits of their ability to conduct operations, while air commanders argued that an FSCL too far out restricted their ability to accomplish the very mission ground commanders counted on, the attack of targets in support of ground operations. In essence, both the Army and the Air Force had developed recognition of operational art, but differed on how to best execute the art on a modern battlefield. These different perspectives would become painfully evident during the Persian Gulf War.

CHAPTER 2

THE PERSIAN GULF WAR AND ITS AFTERMATH

The Conduct of Air-Ground Operations during Desert Storm

The Air Offensive

Only days after the invasion of Kuwait, the United States Central Command (CENTCOM), and Service component staffs began planning for defensive and offensive operations to be conducted from Saudi Arabia.²⁷ The first concept plan, called Instant Thunder, was designed to destroy 84 strategic targets in Iraq in a single week. If CENTCOM's operation worked as planned, air attacks would paralyze Iraqi leadership, degrade their military capabilities, and neutralize their will to fight. The air planners building Instant Thunder believed that the development of precision guided munitions, as well as both active and passive antiradar technologies, would allow attacks aimed directly against the enemy's leadership to neutralize the regime's ability to direct military operations, primarily by eroding communications and depriving leaders of secure locations from which to plan and control operations. This approach distinguished Instant Thunder from previously conceived strategic bombing campaigns.²⁸

In the fall of 1990, JFACC planners modified Instant Thunder in order to better integrate General Schwartzkopf's guidance into the concept of operations. The results of this integration became the foundation of the Operation Desert Storm air campaign plan. One of the Commander in Chief's (CINC) changes was to give far more attention to Phase III, which was air attacks on Iraqi ground forces in the Kuwait Theater of Operations. Another was the decision to begin bombing the Republican Guards in southern Iraq at the start of combat operations. Secretary of Defense Cheney and Chairman of the Joint Chiefs of Staff Powell agreed with General

Schwartzkopf's identification of Iraqi ground forces, in particular the Republican Guard, as the mainstay of the Iraqi defenses in the Kuwaiti Theater of Operations. While the Republican Guard provided the bulk of Iraq's mobile reserves, the regime also counted on it to enforce the loyalty and discipline of the regular troops. In addition, Cheney, Powell and Schwartzkopf believed that weakening the Republican Guards would diminish any Iraqi post-war threat to the region.

Once hostilities commenced, the CINC expected his Air Component to accomplish five critical tasks: 1) isolate and incapacitate the Iraqi regime; 2) gain and maintain air supremacy to permit unhindered air operations; 3) destroy Iraq's nuclear, biological and chemical warfare capability 4) eliminate Iraq's offensive military capability by destroying major parts of key military production, infrastructure, and power projection capabilities, and 5) render the Iraqi army and its mechanized equipment in Kuwait ineffective.²⁹ By far, the overwhelming majority of air effort during the war went against Iraqi ground forces in Kuwait and the lines of communication to those forces.³⁰

The evidence that the air campaign had a devastating effect on Iraqi air and ground forces is irrefutable. Besides destroying large amounts of equipment, the air campaign eroded the confidence of Iraqi soldiers, and ultimately resulted in many of them losing their will to fight.³¹

The air attacks also made it impossible for the enemy to mount any sort of effective defense:

Air power crippled the Iraqi war machine. It neutralized sophisticated air defense systems, destroyed bridges and road junctions, destroyed the Iraqi artillery, and made it difficult for Iraq to maneuver forces on the battlefield. While the success of the bombing campaign varied from unit to unit, it delivered a devastating psychological blow. Air power did this at a negligible cost to itself. The ground war was won in four days; but it was preceded by five weeks of bombing.³²

Yet in spite of its success, the air campaign failed to live up to the expectations of many air power enthusiasts, particularly General "Buster" Glosson and Colonel John Warden, two of CENTCOM's air planners, who envisioned a "victory through air power."³³ Poor weather, the necessity to attack targets at higher than optimal altitudes, CINC and National Command Authority imposed restrictions, changes in targeting priorities, disagreements over battle damage

assessments, Iraqi countermeasures, and other lesser events all combined to make the campaign less effective than air planners had predicted. Day after day, the air war continued, and three weeks past the date initial estimates predicted Iraq would be forced to leave Kuwait, the enemy remained in firm possession of the country, with no indications that it was preparing to leave. Generals Powell and Schwartzkopf believed from the beginning that only a ground offensive could compel the Iraqis to leave Kuwait. As the air campaign dragged on, they became increasingly convinced that their suspicions were correct.

The Ground Offensive

Air power advocates on the CENTCOM staff hoped that for the first time in history air power alone would compel an enemy to do another's will. Yet, after three continuous weeks of bombing, Saddam Hussein remained in firm control of Kuwait. Generals Powell and Schwartzkopf both felt that time was running out for the coalition and that the allied forces preparing for the ground offensive would have to be committed before the end of February if they were to retain their fighting edge. Therefore, they settled on 21 February 1991 as the target date for the commencement of the ground offensive.³⁴

The Army's VII Corps, commanded by Lieutenant General Frederick Franks, was the centerpiece of the Army Forces, Central Command's (ARCENT) scheme for the ground offensive. As the CENTCOM main effort, the mission of VII Corps was to attack in zone along the western Kuwait/Iraq border, penetrating the first echelon defenses and destroying the Republican Guard forces in Kuwait. The XVIII Airborne Corps, positioned in the west, supported the VII Corps fight by attacking north to block the east-west lines of communication along Highway 8, thereby isolating the Iraqi forces in the Kuwaiti Theater of Operations.³⁵

As part of the AirLand Battle doctrine they had come to embrace over the last eight years, both Army and Marine ground commanders were counting on fixed wing assets to attack

the enemy's combat formations before their commitment into the fight. The VII Corps in particular was expecting a major air effort against Iraq's first echelon forces, as well as the Republican Guard divisions farther to the rear.

As it became more and more obvious that the plans for ground combat would be implemented, ARCENT planners lobbied with increasing intensity for a shift in targets from attacks against Iraq's central command and control network to the destruction of the enemy's first echelon defenses. In spite of a lack of any substantial evidence that the air campaign would compel the enemy to evacuate Kuwait, General Glosson remained determined to focus his attacks on Baghdad and other points deep inside the country. Ultimately this put the Air Component on a collision course with the Army and Marines.³⁶

Ground commanders became increasingly frustrated by the Air Force's procrastination in shifting the weight of its efforts against front line combat forces. On 18 February, the ARCENT situation report stated:

Air support related issues continue to plague final preparations for combat operations and raise doubts concerning our ability to shape the battlefield prior to the initiation of the ground campaign. Too few sorties are made available to VII and XVIII corps. And while air support mission are being flown against 1st echelon enemy divisions, Army nominated targets are not being serviced. Efforts must be taken now to align the objective of the air and ground campaign and ensure the success of our future operation.³⁷

Eventually, air planners succumbed to pressure from both the CENTCOM staff and the land force commanders, and began to focus on the destruction of 50% of the enemy's first echelon forces. Shaping the battlefield for the upcoming ground offensive took on a new priority, and Air Force planners began using F-111s against armored formations, lowered the bombing altitudes for F-16s in order to improve accuracy, and revived the Vietnam era tactic of using airborne scouts.

Not long after the increase in attacks against ground forces, differences of opinion arose regarding the assessment of the damage from air attacks. Ground commanders were skeptical of the damage assessments the Air Force was generating after attacks, and they were downgrading

Air Force assessments to as little as one third of the original estimates of enemy damage.³⁸ Heated debates began to emerge as to just how badly the Iraqi forces had been reduced, with the Air Force claiming unrealistically high levels of battle damage, and the Army and national level agencies using excessively conservative estimates. By the 24 of February however, General Schwarzkopf felt comfortable enough with the level of destruction inflicted by air power on the enemy ground forces to order commencement of the ground offensive.

Assessing the impact of air operations in direct support of committed ground forces after the ground portion of the war began is difficult, due to the short duration of the ground war. However, evidence indicates that the attacks by ground forces compelled the Iraqi army to move out of its defensive positions, where it immediately became susceptible to attack from the air. Traditional Close Air Support had only minor effects on the conduct of the ground offensive, since there were few cases where air assets had to deliver ordnance in close proximity to friendly ground forces. Thus, although air power was unable to compel the withdrawal of Saddam Hussein's forces from Kuwait on its own, and its estimates of damage against ground forces were overly optimistic, air power was a key player in shaping the battlefield for an operationally decisive ground war.

The Impact of the AH-64 and ATACMS On Air-Ground Operations

After the war, both the Army and the Air Force began to analyze air power's role in support of ground combat forces. It soon became apparent that the AH-64 Apache helicopter and the Army Tactical Missile System (ATACMS) had a profound impact on the implementation of AirLand battle doctrine as well as air-ground operations.³⁹ These two systems allowed the Army to attack targets far beyond the range of its cannon artillery systems, greatly reducing the ground commander's dependence on Air Force assets to prosecute deep operations. Once the Army

recognized the potential of its newly acquired deep attack assets, it began to encroach into areas traditionally dominated by fixed wing aircraft.

The introduction of the AH-64 to the AirLand battlefield provided the Army's corps and division commanders with the deep attack capability so vital to their warfighting doctrine. While the Apache did not eliminate the Army's need for BAI, it drastically reduced the reliance on fixed wing air power to shape the close battle. For the first time, ground commanders had true control over the timing, location, priority, and intensity of attacks against enemy forces not in direct contact. Unlike fixed wing air power, the Apache served as an integrated element of land power, and was an equal part of the combined arms team. The AH-64 expanded the battlespace in both space and time by extending the range at which direct and observed indirect fires could be concentrated on the enemy. Additionally, Army aviation units were totally immersed in the planning for the operations in which they were a part of, and therefore had a better understanding of how their attack related to the ground commander's overall concept for the operation.⁴⁰

While all of this provided substantial benefit to ground commanders, it convoluted the relationship between the Army and the Air Force regarding deep operations. The Army began to invade what many airmen saw as "air power's battle space." Ground commanders began moving the FSCL out farther to provide protection for rotary winged maneuver forces and intelligence collection assets operating deep within their boundaries, which, as the following sections will illustrate, had a number of second order effects on air-ground relations.

The Army Tactical Missile System (ATACMS) had a similar impact from both the ground and air perspectives. Developed to serve as a multi-purpose missile fired from the M270 Multiple Launch Rocket System, the system provided operational commanders with a ground based, deep fires capability.⁴¹ However, unlike attacks with Apaches, which required substantial planning and coordination to properly execute, the ATACMS provided ground commanders with the capability to attack targets in excess of 150 kilometers beyond front line forces within minutes

of their detection. The ability to attack targets almost instantaneously out to these extended ranges added yet another complication to air-ground operations, since commanders could detect, process and attack targets faster than the Air Force could clear aircraft away from the target area. Air power advocates became concerned that the area in which they were the predominant force would become intermingled with uncontrolled land component fires. For this reason, they began to insist that the traditional definition of the FSCL, which considered the line a permissive fire support coordination measure, was no longer appropriate.⁴² Instead, they argued that the FSCL was in effect a restrictive measure, and that it clearly defined the geographic area of air power's responsibility and authority.

Post War Debates and Changes to Doctrine

The impact of the AH-64 and ATACMS combined with the frustration over the conduct of air-ground operations during the initial phases of the war, and as a result, two key issues regarding air-ground operations emerged almost immediately after the war. The first was a substantially different interpretation between the Army and the Air Force regarding the meaning of the Fire Support Coordination Line (FSCL), while the second was the viability, role, and control of Battlefield Air Interdiction. These two points of contention became intermingled to the point where efforts to resolve one often had a negative impact on efforts to resolve the other, either by compounding an already existing problem or generating another.

The FSCL Debate

The roots of the Fire Support Coordination Line date back to World War II and the "No Bomb Line." Ground commanders placed the line just beyond the range of friendly artillery, and it was primarily intended to mark the area where returning bomber crews could no longer drop ordnance without clearance from the establishing ground commander. In the 1960s, the name of the measure became the Fire Support Coordination Line, and under this new name, the line

served two purposes. First, the line became a no fire line between corps and field armies. Second, it served as a no bomb line between ground and air forces. Therefore, for about twenty years, the FSCL did in fact serve as a boundary, not only between air and ground assets, but between echelons of ground forces as well. Since ground commanders had no assets that were able to fire beyond 15-20 kilometers from the front line, the FSCL worked well as a boundary between the ground and air components. In the 1980s, however, the Army modified the definition and intent of the line, and it became a "permissive" measure instead of a restrictive one. In other words, the FSCL became a line by which fires beyond it did not require clearance from the ground commander responsible for the target area. This change in interpretation, combined with the disappearance of the field army as a warfighting headquarters, had significant implications. The new definition facilitated the attack of targets beyond it, rather than restricting fires short of it. While the Joint Staff and the Army accepted the interpretation of the FSCL as permissive, the Air Force continued to view the line as a restrictive measure, since all air attacks short of it required clearance from a ground commander.

The confusion surrounding the FSCL continued during and after the Persian Gulf War. The Army, Air Force, and CENTCOM staff all had different interpretations of what the line was supposed to do and how to apply it. As ground forces began to advance against the Iraqi Army, the VII and XVIII Corps commanders began to place the FSCL far ahead of their front lines, primarily to ensure that air operations in the same area would not threaten their attack helicopters.⁴³ On 27 February 1991, the FSCL powder keg exploded, primarily because the two corps had extended the line far beyond where their helicopters were operating. This resulted in a gap between the areas where ground commanders were attacking and where air operations were free to operate unhindered. One airman summed up the Air Force's position well when he claimed that "the Army was moving the FSCL well out past where they were going to impact on anything. When they did that, they took away airspace and ground area for us to hit."⁴⁴ When

VII Corps realized that a delay in the attack would prevent them from using their AH-64s as deep as they originally intended, Air Force liaison officer Major David Rhodes called Riyadh to have CENTCOM move the line back to one which made more sense. The CENTCOM staff, however, decided to take control over the placement of the FSCL and chose to leave the line where it was, in effect allowing enemy forces to move for over eight hours with no attack from the air.⁴⁵

After the war, air power advocates blamed the Army's poor placement of the FSCL as the major reason why the Republican Guard Forces escaped from Kuwait. Air Force authors argued that the placement of the FSCL should extend no farther than the range of the MLRS rocket systems supporting maneuver forces, lest there be unnecessary constraints on air combat power. They also began to interpret the area beyond the FSCL as "air power's battlespace" and they argued heavily that just as air missions short of the FSCL needed land component approval, land component missions beyond the FSCL should require clearance from the air component.⁴⁶ Air Force Chief of Staff General Merrill McPeak recommended in 1994 that the Army become limited to fighting the close and rear battles only, and that the Air Force assume responsibility for all deep operations. Under this arrangement, the Army would assume responsibility for all of its close air support, and would hand its deep operations, including control of ATACMS and long range air defense systems, over to the Air Force.⁴⁷

The Army's position on the FSCL was that its newly acquired deep attack capabilities made it necessary for the FSCL to be placed out to a distance that would allow for freedom of maneuver at distances previously attacked using only fixed wing air assets. They maintained that the doctrinal definition of the FSCL as a permissive measure was still valid, and that clearance to fire beyond the line should not be necessary. The Army argued further that *Joint Publication 3-0: Doctrine for Joint Operations* established the Joint Force Land Component Commander (JFLCC) as the one responsible for the synchronization of operations within his boundaries, and as such, he should have authority over all interdiction attacks within those boundaries.⁴⁸

As the debate continued, most of the articles expressing the airmen's point of view saw the FSCL as the most logical delineator between the Army's close fight and the Air Force's deep fight. They began arguing that since air missions short of the FSCL required clearance, they should all come under the purview of Close Air Support. Likewise, they saw all fires beyond the line as interdiction, since the targets beyond the line were not in direct contact with friendly forces, and as a result, ATACMS fires and AH-64 attacks against deep targets should come under the control of the JFACC. This interpretation fit in well with General McPeak's notions dividing the Army's close fight and the Air Force's deep fight, but the airmen were unsuccessful in getting the Army and the Joint Staff to see the issue their way. Various new definitions of the FSCL were proposed and rejected, by the Army, the Air Force, or both. Eventually the issue became so controversial and sensitive that General Powell decided to intervene, and he personally approved a new definition to be included in the 1994 version of *Joint Pub 1-02, Dictionary of Military Terms*.⁴⁹

Under the 1994 *JP 1-02* definition, the FSCL remained a method of reducing the risk of fratricide, rather than the de facto boundary between air and ground combat power desired by the Air Force. Still unsatisfied with the joint definition of the line, the Air Force continued to push for some control over ground force attacks across the line. In 1995, the services agreed to a compromise definition, under which the FSCL was defined as:

A permissive fire control measure, established and adjusted by the land force commander, in consultation with superior, subordinate, supporting, and affected commanders. **It is not a boundary**; synchronization of operations on either side of the FSCL is the responsibility of the establishing commander out to the limits of the land force boundary. It applies to all fires of air, land, or sea weapons systems using any type of ammunition against surface targets. **Short of the FSCL**, all fires are controlled by the land force commander. **Beyond the FSCL**, coordination and restrictive measures are used to avoid conflicting or redundant operations. Forces attacking targets beyond the FSCL must inform all affected commanders to allow necessary reaction to avoid fratricide (emphasis original).⁵⁰

Under this definition, the Air Force was successful in its quest to have some sort of protection from fires across the line, but other than that, the current definition has done little to

solve the problem. Unfortunately, both the Army and the Air Force continue to misuse the FSCL. It often becomes a boundary either between the land and air components, or between Army corps and higher echelons.⁵¹ It also tends to be the primary method of determining the point where CAS ends and Air Interdiction begins, in spite of discussions in Joint, Army and Air Force publications that clearly state that the line is not intended for that purpose. Thus, almost ten years after identification of the problem, the FSCL continues to be a misunderstood and misapplied fire support coordination measure.

The BAI/CAS/AI Debate

As discussed in Chapter 1, the Air Force agreed in a series of memorandums of agreement to refine and implement Battlefield Air Interdiction as part of its air-ground framework.⁵² Although the concept was integrated into Army-Air Force exercises, it was never actually adopted as part of the Air Force's doctrine.⁵³ There are several possible reasons why BAI failed to make it into the official doctrine. First, as Carl Builder states in his book *The Icarus Syndrome: The Role of Air Power Theory in the Evolution and Fate of the U.S. Air Force*, the Air Force had been waging an internal struggle to define exactly what its doctrine was, and the notion of integrating an Army concept into air power theory may have been more than the organization was ready to handle. Another possible reason is that although the Tactical Air Command (TAC) endorsed BAI, many others within the Air Force found that it was simply another form of interdiction, and therefore not necessary.⁵⁴ It is also possible that airmen, who believed so strongly in the principle of centralized control of air power by an airman, were not ready to hand over partial control over the use of air power to a ground commander. Regardless of the reason, the impact was that during the Persian Gulf War, the Air Force conducted Air Interdiction, rather than Battlefield Air Interdiction.

Air power's success in the war made it virtually inevitable that BAI would have no future as part of air-ground operations. Airmen saw air power's impact on the war as substantial, perhaps even decisive, and they cited the problems associated with ground nominated interdiction targets as the rationale for why air power had to be under the centralized control of an airman for it to be effective. They insisted that the Joint Force Air Component Commander be the "supported" commander for interdiction, and that interdiction be conducted under a theater wide perspective. This was contrary to the BAI notion that a target had to relate directly to the scheme of maneuver of a particular ground commander. It also meant that the only way a ground commander would have a target attacked under Air Interdiction was if it fell within the priorities established by the Joint Force Commander, and made it through a rigorous nominating and selection process (run primarily by Air Force personnel whose understanding of ground combat was minimal at best). As joint doctrine on interdiction began to emerge, the Joint Targeting Coordination Board became the mechanism by which land component nominations were compared to the Joint Force Commander's priorities. Since any particular target nominated had to fall within theater wide priorities, the probability of attack for a specific target within a corps' area became substantially smaller than under the BAI framework, where specific sorties were allocated toward shaping the ground battle, albeit from a theater wide perspective.

Ironically, this compounded the FSCL issue, because under this new framework, the only way a ground commander could guarantee the attack of an important target was to use the CAS sorties allocated to by higher echelon commanders. Since the Air Force was attempting to use the FSCL as the divider between CAS and AI, corps commanders had to keep the line relatively far forward if they were to ensure a deep target fell with the CAS area. Thus, the lack of air attacks in direct support of Army deep battles made an already complex issue even more convoluted.

The Current Doctrine.

In the years following the Persian Gulf War, attempts to clarify the doctrine for air-ground operations were only marginally successful. Before proceeding to the next chapter, a review of the doctrine as it exists today is necessary. Joint documents divide air-ground operations into two categories, CAS and AI. CAS is defined as:

air action by fixed and rotary-wing aircraft against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces. CAS can be conducted at any place and time friendly combat forces are in close proximity to enemy forces. The word "close" does not imply a specific distance; rather, it is situational. The requirement for detailed integration because of proximity, fires, or movement is the determining factor. CAS provides firepower in offensive and defensive operations to destroy, disrupt, suppress, fix, or delay enemy forces.⁵⁵

Likewise, Air Interdiction operations are:

Air operations conducted to destroy, neutralize, or delay the enemy's military potential before it can be brought to bear effectively against friendly forces at such distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required.⁵⁶

Notice that neither of these definitions refers to the FSCL as the dividing line of where one form of attack begins and the other ends. Instead, the FSCL is defined as:

A fire support coordination measure that is established and adjusted by appropriate land or amphibious force commanders within their boundaries in consultation with superior, subordinate, supporting, and affected commanders. Fire support coordination lines (FSCLs) facilitate the expeditious attack of surface targets of opportunity beyond the coordinating measure. An FSCL does not divide an area of operations by defining a boundary between close and deep operations or a zone for close air support. The FSCL applies to all fires of air, land, and sea-based weapon systems using any type of ammunition. Forces attacking targets beyond an FSCL must inform all affected commanders in sufficient time to allow necessary reaction to avoid fratricide. Supporting elements attacking targets beyond the FSCL must ensure that the attack will not produce adverse effects on, or to the rear of, the line. Short of an all air-to-ground and surface-to-surface attack operations are controlled by the appropriate land or amphibious force commander. The FSCL should follow well defined terrain features. Coordination of attacks beyond the FSCL is especially critical to commanders of air, land, and special operations forces. In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the FSCL. However, failure to do so may increase the risk of fratricide and could waste limited resources.⁵⁷

Summary

The airmen tasked with planning Operation Desert Storm envisioned a war in which air power would be unilaterally decisive. They believed that by attacking Iraq's infrastructure, Saddam Hussein would be compelled to remove his forces from Kuwait. Even when it became increasingly obvious that General Glosson's strategy was not having its desired effect, Air Force planners resisted shifting their effort from attacking infrastructure to attacking ground combat forces. When General Schwarzkopf finally directed them to implement the change, they insisted on following a strategy of Air Interdiction, rather than the strategy of Battlefield Air Interdiction that the ground commanders were expecting. The result was a perception among ground commanders that they did not have sufficient input regarding the targets to be attacked within their areas of responsibility, and it led to a great deal of mistrust and frustration between the air and land components, both in terms of target selection and in the assessed damage to those targets which were attacked.

The placement of the Fire Support Coordination Line, as well as the use of AH-64s and ATACMS, began to manifest themselves once the ground offensive phase of the operation began. The placement of the FSCL caused a great deal of confusion amongst the land and air components as well as the joint staff, and the inability to coordinate air attacks short of it was the primary excuse for the escape of a large number of Republican Guard forces. Attack helicopters and ATACMS missiles began to intrude on the battlespace traditionally dominated by fixed wing aircraft, and this made the Air Force very uncomfortable.

After the war, air power advocates began arguing that air power had been the decisive component of the war, and that the Air Force should retain control of the deep fight. They interpreted all missions not in close proximity to friendly forces as Air Interdiction, and began to argue that the FSCL was the most logical dividing line between CAS and interdiction. The differing interpretations of how to integrate fixed wing operations

with ground maneuver resulted in a series of changes to doctrinal definitions, none of which truly solved the problem at hand.

CHAPTER 3

SOLVING THE AIR-GROUND DILEMMA

Based on the analysis presented in the first two chapters, it is possible to draw some conclusions regarding the nature of operations beyond the Forward Line of Troops (FLOT). A fundamental characteristic of operational art is the attack of enemy forces simultaneously throughout the depths of his formations. These deep attacks typically take place between 30 and 70 kilometers from the FLOT. Both the Army and the Air Force have systems that allow them to accomplish this task, but the services have different, yet equally valid perspectives as to what targets should be attacked, where to focus the priorities, and how to control those attacks. Essentially, the Army believes that deep operations shape decisive, close combat operations, and therefore, ground commanders should have a major role in determining what targets get attacked within their area and when.⁵⁸ The Air Force, on the other hand, sees deep operations as a theater wide program of individual attacks designed to defeat enemy forces before they can be brought to bear against friendly forces, and these attacks may or may not have a relationship to a ground scheme of maneuver.⁵⁹

These differing service viewpoints are not likely to change, since they are critical to the successful application of ground and air combat power against an armed force. This means that any proposed solution to the problem must be able to fit within the two services' theories in order for it to be acceptable. Keeping this in mind, this study examined three alternatives as possible solutions: 1) keeping the existing doctrine, but clarifying the roles and responsibilities for deep operations amongst the Joint, Army and Air Force commanders, 2) implementing a variant of Battlefield Air Interdiction called Air-Ground Interdiction which would maximize Army and Air

Force interoperability within the disputed area and 3) changing the Fire Support Coordination Line to make it the actual delineator between Close Air Support and Air Interdiction.

In the analysis, the third course of action was determined unfeasible, because any attempt to move the FSCL within an air tasking order cycle would have adverse effects on both the ground and air components, especially during offensive operations. Once advanced, the status AI targets short of the FSCL would require re-evaluation to determine whether they should be cancelled, changed to CAS, or nominated for attack on a subsequent day.⁶⁰ In theory, a target making it through the nomination process and on to the Air Tasking Order becomes part of the theater commander's overall interdiction effort. Therefore changing an AI target to CAS risks removing a target from those that the JFC has determined he wants his interdiction efforts directed against. If the original target nomination came from an agency outside of his command, the ground commander is likely to determine that he does not want to use sorties allocated to him to attack it, in which case a high payoff target may go unattacked. In defensive operations, the exact opposite becomes true. Moving the FSCL rearward will cause targets previously classified as CAS to become AI, and if they fail to meet the theater commander priorities, they risk cancellation, regardless of their importance to the ground commander. Simply stated, using the FSCL as the CAS/AI demarcation line creates a number of artificial constraints on both air and ground operations, and does virtually nothing to facilitate the integration of air assets with the ground battle. With that being the case, the following discussion is limited to the first two of the options.

Option 1: Clarify Existing Roles and Responsibilities

The premise in this course of action is that the existing doctrine, with some minor modifications and definition changes, can resolve the deep battle problem. It assumes that given a clear, unambiguous doctrine and well defined roles and responsibilities, joint, land and air

component commanders will work within that framework, and will ensure that the tactics, techniques and procedures they employ are not contradictory to doctrinal definitions or intent. In other words, this course of action combines the use of boundaries, enforcement of the FSCL as a measure solely for the prevention of fratricide, and a revision of doctrinal literature to make the existing system work.

The use of forward boundaries by Joint and Land Component commanders is critical to this approach. The doctrinal norm for forward corps boundaries becomes the area under which they are expected to conduct ground and rotary winged maneuver within a 24 hour period, and is moved forward or rearward as necessary, based on the tempo of the battle. In the area between the corps forward boundary and the land component boundary, air interdiction operations have a dual mission of shaping future ground operations and destroying the enemy's ability to bring his combat power to bear against friendly forces. The terrain beyond the land component boundary becomes the JFACC's battlespace, where he is free to attack targets in whatever manner he feels will best achieve the JFC's intent.

The positioning of the FSCL is determined by corps commanders, based on where they believe necessary to avoid fratricide to ground forces. Indirect fires and rotary winged operations beyond the FSCL are deconflicted with appropriate air component agencies, while all fires short of the FSCL continue to be cleared by the effected ground commander.

This methodology uses modifications to existing doctrinal discussions regarding air interdiction to reduce the confusion that currently exists, particularly with regard to supporting versus supported commanders. For example, the 1995 edition of *Joint Pub 3-0* states that the JFACC is the supported commander for air interdiction, while the ground commanders are the supported commanders within their area of operations. The manual's discussion of air interdiction within a ground commander's boundaries is limited to a single paragraph, and does little to resolve who has primary responsibility with the area.⁶¹ The manual must clarify how the

JFC consults with land component commanders to determine priorities for AI, and how the JFC's guidance for AI must include giving priority to nominations from specific unit as well as types of targets to attack.

There are several advantages to using this approach toward solving the problem. First, it takes advantage of previous work conducted by keeping doctrinal changes to a minimum. By clarifying existing concepts rather than introducing new ones, most of the tactics techniques and procedures currently in use will remain valid. This option also minimizes the second and third order effects on Army and Air Force doctrine that a radical revision of joint doctrine can cause. Keeping the FSCL close to ground forces will reduce, if not eliminate, the need for non-doctrinal procedures such as "Kill Boxes", which are intended to facilitate air operations short of an FSCL extended too deep.⁶² Likewise, using forward boundaries to delineate various areas of responsibility greatly reduces the confusion caused by vague terms such as "supported" and "supporting" commanders currently used in joint and service doctrine. Finally, a more in depth discussion on how the Joint Force Commander integrates the priorities of subordinate ground forces into the overall priorities for air interdiction should go a long way toward reducing the angst most corps commander's currently have regarding their ability to influence the attack of deep targets within their boundaries.

There is, however, a major disadvantage to this course of action as well. It does little to integrate the attack of targets from the air directly with a ground scheme of maneuver. Under this framework, air-ground operations will probably continue to be separate but concurrent attacks across the depths of the battlefield, rather than a vital component of a well synchronized campaign that maximizes the capabilities of both air and ground forces simultaneously. The integration of air interdiction with ground maneuver will most likely be limited to the attack of targets nominated by corps commanders. At the same time, the use of ground maneuver to facilitate the attack of targets from the air will be virtually non-existent.

Option 2: Implement a Variant of Battlefield Air Interdiction Called Air-Ground Interdiction

This course of action arises out of a belief that only the implementation of a new doctrinal concept will solve the air-ground dilemma. It assumes that the Army's view of deep operations to shape the close battle is not necessarily mutually exclusive with the Air Force's desire to destroy enemy forces before they can be committed to the close fight. If approached from the proper perspective, the two theories can be combined within a framework that supports doing both. It also assumes that the desire to achieve synergy in air-ground operations will outweigh service parochialism and attempts to use doctrine as a means of winning budget battles between the services.

Under this framework for solving the problem, counter-land operations expand to form a third category called Air-Ground Interdiction (AGI). Air-Ground Interdiction is not just another form of air support to ground forces. On the contrary, the intent behind AGI is to develop a symbiotic relationship between air and ground forces, where the synergism generated by combining the two maximizes the effects against the enemy.

AGI is defined as: "theater level attacks using either air or land component assets against hostile targets not in close contact with friendly forces, in which the air attack of the target facilitates the ground scheme of maneuver, land component attack of the target facilitates air operations, or both". The difference between AGI and traditional Air Interdiction is that targets attacked as AGI have a direct relationship to the theater commander's ground maneuver scheme, either because they help shape the maneuver battle, or because ground maneuver has facilitated the attack of the target from the air. Likewise, AGI is not a subset of AI, but rather a separate and distinct form of counter-land operations, and as a result, the percentage of sorties apportioned to AGI is part of the JFC's overall apportionment guidance, just as CAS and AI are.

The process for nominating and selecting AGI targets is relatively straightforward. The land component commander nominates targets which, if successfully attacked using air assets, will facilitate ground operations. Similarly, the air component commander nominates targets for attack by land component assets which, if successful, will facilitate air operations. The Joint Targeting Coordination Board, under the guidance provided by the JFC, selects the targets that best suit the JFC's guidance for AGI and maximize the synergy developed when air and ground operations are synchronized. Land component nominations that survive the screening process are tasked to the air component for attack, and air component nominations that survive are tasked to the land component for attack, normally by ATACMS or rotary winged maneuver assets.⁶³

Since the defining characteristic for AGI targets is their relationship across components, rather than their location on the battlefield, AGI targets can exist in the same general area as AI targets. However, the predominant area for AGI operations will be the zone 30 to 70 km from the FLOT, where air and ground forces have both a mutual interest and the ability to influence each other's operations. As with Option 1, the positioning of the FSCL is determined by corps commanders, based on where they believe necessary to avoid fratricide to ground forces. AGI targets may be located on either side of the FSCL.⁶⁴

The greatest benefit to this approach is that it takes advantage of the overlapping areas of interest between ground and air components, rather than dividing responsibilities between the two. Previous studies have shown that air attacks against enemy combat forces are most effective when they are synchronized with a ground scheme of maneuver.⁶⁵ Thus, the AGI concept provides ground commanders with a form of interdiction that is directly related to ground operations while simultaneously providing air commanders with a method for locating and flushing out high payoff targets. Because Air-Ground Interdiction sorties remain under JFACC control, rather than allocated to a ground commander, the use of air power within the theater remains centralized, further increasing its effectiveness. Finally, implementation of the AGI

concept provides theater level planners with a more robust method of integrating air and ground operations, and it provides them with a mechanism for coordinating ground and air power from the start of the planning process.

Unfortunately, implementing the Air-Ground Interdiction model will require a second quantum leap in operational cognition. It means forsaking the traditional mindset of supported and supporting commanders in favor of one that embraces the complexity of mutually supporting operations, inextricably linked to one another. Given the fervent debates within the Army and Air Force associated with AirLand Battle doctrine, it is reasonable to conclude that efforts to implement AGI would encounter substantial resistance from elements within both services. Another disadvantage associated with AGI is that it will greatly complicate the development of courses of action at the Joint level, since the ground scheme of maneuver must be able to enhance air operations. This is likely to increase the burden on joint planners as well as the Joint Targeting Coordination Board.

Summary

The Army and the Air Force have differing views regarding deep operations that are not likely to change in the next few years. The Army conducts deep operations at corps and division level to shape close battles, while the Air Force conducts Air Interdiction at the theater level in an attempt to defeat enemy forces before they can be committed against ground forces. In an attempt to resolve this dilemma, this study examined three distinct courses of action.

One of the three options considered, using the FSCL as the demarcation between CAS and AI, proved unfeasible because it created too many problems concerning the movement of the line and its impact on CAS and AI missions. This left Options 1 and 2 as possible solutions to the problem. By simply clarifying doctrinal roles and responsibilities, Option 1, minimizes the impact on the services and takes advantage of recent changes in doctrine. It is easier to implement, but it will segment, rather than integrate air and ground combat power. Option 2,

implementing Air-Ground Interdiction, is a more radical approach to solving the air-ground problem, but it maximizes the synergy that occurs when air and ground operations are well synchronized. Although more difficult to implement, the benefits gained are substantial. The final chapter in this study compares these two options, and makes recommendations as to which of the two to adopt.

CHAPTER 4 COMPARISON, RECOMMENDATIONS, AND CONCLUSIONS

Comparison of Options

Evaluation Criteria

This study used a subjective assessment of Options 1 and 2 to determine which would be the better solution to the air-ground dilemma that exists. The two courses of action were compared against one another based on 1) their potential to satisfy the Joint, Army, and Air Force communities simultaneously, 2) the degree of doctrinal change required to implement the course of action, and 3) the degree of improvement in efficiency that would result if the option was applied.

Clearly, the most important of these criteria is the potential to satisfy the Joint, Army, and Air Force simultaneously. Changing the doctrine makes little sense if it does not result in increased agreement amongst the services. The same holds true for improvements in efficiency regarding air-ground operations. Hence, this criterion has a weighting factor of three. Option 2 satisfies this condition better than Option 1 because it provides the JFACC with a means of nominating targets for attack by land component assets, which Option 1 does not.

The second criterion, the degree of deviation from current doctrine required, is next in importance. Chapters 1 and 2 provided illustrations of how changes in doctrine are exceptionally difficult to implement, especially when the doctrine has inter-service implications. This means the changes to existing doctrine are not something to be taken lightly. Based on this assessment, the degree of deviation from current doctrine required has a weighting factor of two. The primary advantage to Option 1 is that it minimizes the changes to current doctrine as opposed to Option 2,

which requires an entirely different approach to deep operations. Thus for this evaluation aspect, Option 1 is better than Option 2.

Although the improvement in efficiency in attacking targets is ranked third, it still has great significance in resolving the air-ground issue. One can expect that Option 2 will have a greater increase in efficiency than Option 1 because of the greater synchronization between ground and air operations. Accordingly, Option 2 rates better than Option 1. The table below summarizes the comparison of Options 1 and 2.

Criteria	Option 1	Option 2
Potential to satisfy Joint, Air and Land Commanders simultaneously (x 3)	$(1 \times 3) = 3$	$(2 \times 3) = 6$
Degree of doctrinal change required (x2)	$(2 \times 2) = 4$	$(1 \times 2) = 2$
Improvement in efficiency	$(1 \times 1) = 1$	$(2 \times 1) = 2$
Total	8	10

Based on this analysis, Air-Ground Interdiction should be the first choice for improving the conduct of deep operations and interdiction against enemy forces. AGI's greatest selling point is that it provides the services with a mutually beneficial, synchronized, and synergistic means of attacking targets in the area 30 to 70 km from the FLOT.

Yet it is important to keep in mind the tremendous challenges associated with implementing the concept. Doctrinal change is never easy, especially in light of recent service attempts to use doctrine as a means of obtaining scarce defense funds. Those who believe that AGI is a viable solution to improving air-ground operations have serious obstacles to overcome before the notion becomes an integral part of Joint, Army, and Air Force doctrine. Because of these challenges, both options presented in this chapter warrant further analysis, since implementation of AGI may prove impractical, either from reasons unanticipated in this study or because of resistance to such a radical change in doctrine. In this case, a modification of existing doctrine becomes the only alternative.

Recommendations for Implementing Air-Ground Interdiction

An in-depth discussion of how new ideas become established doctrine is beyond the scope of this study. Nonetheless, there are some recommendations regarding how to gain approval of AGI that are worth mentioning.

The Air Land Sea Application Center (ALSA) is ideally suited to further examining the potential of AGI. ALSA is a joint, cross-departmental organization chartered by the four Services to rapidly respond to service interoperability issues. Their mission is to develop multi-service tactics, techniques, and procedures, facilitating joint information exchange and operational solutions across the entire military spectrum.⁶⁶ This mission makes ALSA uniquely suited to evaluating AGI and making a recommendation regarding its viability. In fact, ALSA support is virtually essential if AGI is to move on to higher level staffs for evaluation.

If further analysis indicates the doctrine is practical, doctrine developers on the Joint, Army, and Air Force staffs can then examine AGI from their own, individual perspectives. It is vitally important that the services compare AGI to other emerging doctrinal concepts to ensure compatibility. At the same time, the services and Joint staff must suspend the preconceived notions regarding the relationships between air and ground combat power, and assess the concept with an open mind. Finally, supporters of AGI must be prepared to address the legitimate concerns and questions of those expected to operate under the doctrine.

The air-ground dilemma discussed in this study is a complex problem, which unfortunately requires a complex solution. The initial analysis conducted in this study indicates that Air-Ground Interdiction has the greatest potential to resolve the quandary and thus, at a minimum, AGI warrants further examination by Joint, Army and Air Force doctrinal developers.

If the concept works as intended, the degree of inter-service cooperation and efficiency regarding deep operations will be greater than ever before.

Conclusions

The traditional relationship between Close Air Support and Air Interdiction began to change when the Army developed its AirLand Battle Doctrine. Because it lacked the assets to conduct deep operations on its own, the Army lobbied for the introduction of Battlefield Air Interdiction, where air attacks attacked targets in order to shape future battles on the ground. BAI gained some support within the Air Force, but it remained a controversial issue among airmen for years. Some in the Air Force saw it as a modified form of CAS due to its relationship to ground forces, while others saw it as a form of interdiction because it attacked targets not in contact with friendly forces. The lingering controversy regarding BAI prevented it from integration into official Air Force doctrine, in spite of its adoption by Joint staff, NATO staff, and the Army.

When the Persian Gulf War began, airmen hoped to win the conflict before ground combat power became necessary. Initial air operations, therefore, concentrated on attacking the Iraqi infrastructure, rather than on the ground combat forces traditionally associated with BAI. Even after it became obvious that ground forces were necessary, air operations focused on targets closer to Air Interdiction than Battlefield Air Interdiction, since the targets attacked had little relationship to the scheme of maneuver and did not reflect the targets which the VII and XVIII Corps Commanders wanted attacked.

At the same time, the war validated the Army's new ability to use the AH-64 Apache and the Army Tactical Missile System to conduct autonomous operations, and as a result its dependence on air power to do the job dropped considerably. These new weapons systems operated in areas formally dominated by the Air Force, and further complicated the relationship between Close Air Support and Air Interdiction. The Army and Joint Staff formally eliminated

BAI from their doctrine, and the meaning, use, and placement of the Fire Support Coordination Line became a serious point of contention between the services.

Close Air Support, Air Interdiction, and the Fire Support Coordination Line became so intertwined with one another that it became impossible to clarify one issue without further complicating another. Airmen saw the FSCL as restrictive, the Army and the Joint Staff saw it as permissive. Some argued that it should form the dividing line between ground and air power's battlespace, while others argued that the line should have no bearing on CAS or AI whatsoever. This resulted in a series of lengthy modifications to doctrinal definitions that did more to reflect the parochial positions of the two services than actually solve the underlying problem.

Therefore, changes to the current doctrine regarding deep operations and interdiction are most definitely required if the Army and the Air Force are to resolve the problems associated with the attack of targets in the deep operations/Air Interdiction area. The best solution to the problem is in fact a radical departure from current thought on the issue. The concept of Air-Ground Interdiction (AGI), where attacks by either air or land component assets are integrated with their component counterparts in such a way that a symbiotic relationship between air and ground forces develops, generates synergism by combining air operations with land component maneuver and fires, therefore maximizing the effects against the enemy.

ENDNOTES

¹ Terry L. New, "Where to Draw the Line Between Air and Land Battle" (Research Report, Air War College, 1995), 1.

² Donald G. Oxford, "The Fire Support Consternation Line?" *Theater Operations*, Center for Army Lessons Learned, (accessed 12 January 2000) available at <http://www.call.army.mil>; Internet.

³ Ibid.

⁴ Ibid.

⁵ Dr. James Schneider, Professor of Military Theory at the Army's School of Advanced Military Studies, postulates that the key characteristics of operational art are: 1) synergistic tactical actions 2) synchronized attacks against enemy forces, 3) simultaneous operations in depth, 4) operational maneuver and attrition, 5) translation of war aims into tactical missions and tasks, 6) sequential operations and 7) disruption of the enemy's systems vs. the destruction of his forces.

⁶ Harold R. Winton, "Partnership and Tension: The Army and Air Force between Vietnam and Desert Shield," *Parameters* 26 no. 1 (Spring 1996): 103.

⁷ Winton, 107.

⁸ Richard M. Swain, "Filling the Void: The Operational Art and the U.S. Army." (Monograph, U.S. Army School of Advanced Military Studies), 26-27.

⁹ Herbert I. London, *Military Doctrine and the American Character: Reflections on AirLand Battle* (New Brunswick: National Strategy Information Center, 1984), 24.

¹⁰ William R. Richardson, "FM 100-5: The AirLand Battle in 1986," *Military Review* 72, no. 1 (Jan-Feb 1997): 174. Richardson assumed command of TRADOC in 1983.

¹¹ Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (Portland, Oregon: Frank Cass Publishers, 1997), 305. According to Naveh, "Like its predecessor, the [1986] manual perceives the practice of war as a holistic notion reflected simultaneously in three areas of activity: strategy, operations, and tactics. [However,] the mechanistic approach that perceived the operational context as a distinctive level of activity is replaced by a new approach. The characterization of the operational context as an 'art' derived, as in the Soviet case, from its identification as a unique cognition, bridging abstract definitions of aims, capabilities and, limitations, and mechanical performances like movements, launches of fires and other energies, maintenance or seizure of space, and so on." From Naveh's point of view, the highlights of the 1986 edition of FM 100-5 were its clarification of the concepts of operational art and synchronization, as well as the tactical, operational, and strategic levels of war.

¹² Winton, 108.

¹³ U.S. Army, *Field Manual 100-5: Operations*, (Fort Leavenworth, Kansas: U.S. Army Combined Arms Center, 1982), 7-11. Although beyond the scope of this paper, OAS also included Tactical Air Reconnaissance, which involved the use of fixed wing assets to find targets for deep operations. For additional information regarding the development of OAS within NATO, see David J. Stein, *The Development of NATO Tactical Air Doctrine, 1970-1985* (Santa Monica, CA: RAND Corporation, 1987) 33.

¹⁴ FM 100-5, (1982), 7-11.

¹⁵ Ibid.

¹⁶ U.S. Army, *Field Manual 100-5: Operations*, (Fort Leavenworth, Kansas: U.S. Army Combined Arms Center, 1986), 48.

¹⁷ Winton, 115. Winton also argues that these relationships were abetted by a gradual but distinct change in Air Force leadership. In 1960, bomber pilots held 77 percent of the top Air Force leadership positions, fighter pilots, 11 percent; by 1990, these percentages had become 18 and 53 percent respectively. This shift seems to have been driven at least in part by the more prominent role of fighter pilots in the Vietnam War and the declining numbers of bombers in the inventory. Winton argues that based on this trend, it was legitimate to suspect that the Air Force fighter community was more favorably disposed to welcome the Army's doctrinal advances than the bomber community was.

¹⁸ Winton, 109.

¹⁹ Winton argues that General Creighton Abrams' 1973 decision to eliminate the field army as a ground echelon of command also compounded the problem. In both WW II and Korea, the field army was the focal point of air-ground cooperation, with a Tactical Air Command post co-located with each field army. The disappearance of the field army brought about a state of disarray regarding the process of air-ground interface.

²⁰ Romjue, 63. The memorandum was signed by the Commanding Generals of TAC and TRADOC on 23 May 1981. On 22 September 1981, HQ, Department of the Air Force issued a memorandum which stated that the agreement was authoritative Air Force doctrine, and it would be incorporated into relevant Air Force doctrinal manuals.

²¹ Michael R. Gordon, "The Army's Air Land Battle Doctrine Worries Allies, Upsets the Air Force." *National Journal* 18 June 1983: 1277.

²² United States Air Force, *Air Force Manual 1-1: Basic Aerospace Doctrine of the United States Air Force*. (Washington: 1984), 2-20.

²³ Winton, 110.

²⁴ Ironically, ATACMS was originally called the Joint Tactical Missile System and was one of the 31 Initiatives in the 1984 Memorandum of Agreement. The Air Force, never overly enthusiastic about any weapons system that did not have room for a pilot, withdrew its portion of the funding for the project in May 1984, the same month that the service Chiefs of Staff signed the memorandum. Army funding continued however, and the Army fired versions against Iraqi forces during the Persian Gulf War.

²⁵ This definition explains why the Air Force continues to interpret the FSCL as a restrictive measure, rather than a permissive one as defined in both Army and Joint doctrine. As originally developed, the no bomb line applied primarily to aircrews returning from interdiction and armed reconnaissance missions with unexpended ordnance. These pilots needed to be able to take advantage of targets of opportunity without endangering friendly ground forces.

²⁶ Winton, 113.

²⁷ U.S. Department of Defense, *Conduct of the Persian Gulf War: Final Report to Congress*. (Washington, U.S. Government Printing Office, 1992): 91.

²⁸ Ibid, 92.

²⁹ Ibid, 94.

³⁰ Thomas Keany and Eliot Cohen, *Gulf War Air Power Survey Summary Report*, (Washington: U.S. Government Printing Office, 1993), 91.

³¹ Ibid, p. 107.

³² Michael Gordon and Bernard Trainor, *The General's War*, (Boston: Little, Brown & Co, 1995), 474.

³³ Gordon and Trainor, p. 189. In an 11 December 1990 briefing to Secretary of Defense Cheney, COL Warden predicted that in 15 days, 90 percent of the Iraqi armor and artillery would be wiped out, and that reoccupation of Kuwait could be accomplished with out commitment of U.S. ground forces. Warden believed that Arab ground forces would be able to march virtually unopposed into Kuwait, with U.S. forces held in reserves should something go wrong.

³⁴ Ibid, 307.

³⁵ Swain, *Lucky War*, 208.

³⁶ Gordon and Trainor, 311.

³⁷ Ibid, 309.

³⁸ Keaney and Cohen, 106. The Gulf War Air Power Survey, perhaps the most balanced assessment of air power's impact on the Persian Gulf War, concluded that the initial estimates of Iraqi equipments destroyed by air attack were in fact inflated. The survey also concluded that assessments of the amount of systems in the theater were too high, and thus the errors offset one another. The shortfall in this conclusion is that it underestimates the impact a poor analysis of battle damage can have on future operations.

³⁹ Of these three, only the AH-64 Apache helicopter was in full scale production. ATACMS had just entered low rate production for its upcoming Initial Operational Testing and Evaluation and J-STARS was only in the prototype stage.

⁴⁰ U.S. Army, *Field Manual 1-100: Army Aviation Operations* (Fort Rucker, Alabama, U.S. Army Aviation Center, 1997): 1-3,4.

⁴¹ U.S. Department of Defense, *Conduct of the Persian Gulf War: Final Report to Congress*. (Washington, U.S. Government Printing Office, 1992): 753. During the Persian Gulf War, 35 ATACMS missiles were fired against Iraqi targets, predominantly at enemy air defenses. The high degree of accuracy, effectiveness and responsiveness of the system prompted the CINC to request that all available ATACMS be deployed into the theater.

⁴² U.S. Army, *Field Manual 6-20-30: Tactics, Techniques and Procedures for Fire Support for Corps and Division Operations* (Fort Sill, OK, U.S. Army Field Artillery Center, 1989): F-2. A permissive fire support coordination measure is one that is designed to facilitate the attack of targets. Restrictive measures impose requirements for specific coordination (usually on an individual target basis) before the engagement of those targets effected by the measure. Restrictive measures are primarily designed to safeguard friendly forces.

⁴³ There is also some evidence which indicates that in the VII Corps zone, the FSCL was extended far out in an attempt to gain a greater degree of control over the types of targets the Air Force would attack within its boundaries.

⁴⁴ Air Force Colonel Michael Reavy, quoted in Gordon and Trainor, p. 411.

⁴⁵ Gordon and Trainor, 412.

⁴⁶ Ricky Ales, "Air Power's Battlespace," *Field Artillery Journal* 86, no. 3 (May-June 1996): 10-13.

⁴⁷ Terry L. New, "Where to Draw the Line between Air and Land Battle", (Research Report, Air War College, 1995), 1-2.

⁴⁸ Donald G. Oxford, "The Fire Support Consternation Line?", *Theater Operations*, Center for Army Lessons Learned, available at www.call.army.mil.

⁴⁹ In the 1994 version of JP 1-02 the FSCL is defined as "A line established by the appropriate ground commander to ensure coordination of fires not under his control but which may effect current tactical operations. The Fire Support Coordination Line is used to coordinate fires of air, ground or sea weapons systems using any type of ammunition against surface targets. The Fire Support Coordination Line should follow well defined terrain features. The establishment of the Fire Support Coordination Line must be coordinated with the appropriate tactical air commander and other supporting elements. Supporting elements may attack targets forward of the Fire Support Coordination Line without prior coordination with the ground force commander provided the attack will not produce adverse surface effects on or to the rear of the line. Attacks behind this line must be coordinated with the appropriate ground force commander."

⁵⁰ U.S. Department of Defense, *Joint Pub 3-0: Doctrine for Joint Operations* (Washington, 1995): xviii.

⁵¹ In a corps level exercise conducted in the spring of 2000, the FSCL was the boundary between the corps and its higher land component headquarters. The line was located approximately 175 kilometers from friendly front line forces, much to the consternation of both the corps commander and Air Force participants. Despite pleas from both ground and air commanders, the line remained this far out for most of the exercise, and caused both of the services to develop an impromptu method for freeing up terrain for air attack. Although the method they devised ultimately proved satisfactory, in an actual operation the misuse of the FSCL would most likely have resulted in a repeat of problems associated with air-ground operations in the Persian Gulf War.

⁵² Richard Wolf, *The United States Air Force Basic Documents on Roles and Missions*. (Washington, Office of Air Force History, 1987): 415-23.

⁵³ Harold R. Winton, interview by the author, 17 April 2000.

⁵⁴ Merrill McPeak, "TACAIR Missions and the Fire Support Coordination Line". *Air University Review* 36 no. 6 (Sep-Oct 1985): 65-72. McPeak's article, which he wrote while serving as the TAC Deputy Chief of Staff for Plans, provides ample evidence that TAC supported the BAI concept.

⁵⁵ Department of Defense, *Joint Pub 3-09.3: Joint Tactical Techniques and Procedures for Close Air Support*

⁵⁶ *Joint Pub 1-02*, 18.

⁵⁷ *Ibid*, 171.

⁵⁸ U.S. Army, *FM 100-5: Operations* (1993): 6-14.

⁵⁹ U.S. Air Force, *AFDD 1: Air Force Basic Doctrine*, (Washington, D.C. 1997): 48.

⁶⁰ T.C. Gilkeson, "The Fire Support Coordination Line (FSCL) and Air Operations-An ASOC Perspective," *Air Land Bulletin* 92 no. 2 (June 1992): 6.

⁶¹ Department of Defense *Joint Pub 3-0*, IV-11,12.

⁶² Officially known as the Joint Target Reference Grid System, "Kill Boxes" are designed to facilitate the rapid clearing and deconfliction of targets, primarily those short of the FSCL. It consists of a series of map grids, approximately 30 x 40 nautical miles in area. Each of these grids is further subdivided into nine kill boxes roughly 10 x 14 nautical miles in area. An "open" kill box means that the JFACC is free to attack targets within the area without further coordination with ground forces. Kill boxes short of the FSCL are then opened and closed by the ground force commander, as he feels appropriate. The system is currently in use in both Korea and the Balkans.

⁶³ Depending on the lead time required and forces available, airborne or air assault forces could also be tasked to attack targets nominated by the air component commander.

⁶⁴ However, as with Option 1, corps commanders should place the FSCL no farther out than necessary to prevent fratricide.

⁶⁵ Price T. Bingham, *Ground Maneuver and Air Interdiction in the Operational Art* (Maxwell Air Force Base, Alabama, Air University Press, 1989): 2.

⁶⁶ Air Land Sea Application Center, *Air Land Sea Application Center: Producers of Tactics, Techniques and Procedures for the Joint Warfighter* (accessed 23 April 2000); available from <http://www.dtic.mil/alsa/index.htm#Info>; Internet.

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